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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,148	04/26/2006	Tadashi Dojo	02910.103293.1	3336

5514 7590 06/13/2008

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EXAMINER	
VAJDA, PETER L	
ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
06/13/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,148	DOJO ET AL.	
	Examiner	Art Unit	
	PETER L. VAJDA	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/26/2006, 12/20/2006, 03/30/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-341598 (equivalent to Matsunaga *et al.* US PGP 2003-044708) in view of Sawada *et al.* (US PGP 2003/0039909) and considered with JP 06-118700.

Matsunaga *et al*. is a US equivalent document of JP 2002-341598 and will be cited in this rejection for clarity. Matsunaga teaches a toner comprising a binder resin, a colorant, a wax, and an inorganic fine powder (Abstract). Said toner also comprises a magnetic material having an average particle size of from 0.1 to 0.5 micrometers and a saturated magnetization of 10-200 Am^2/kg in a magnetic field of 796 kA/m (p. 7 [0095]). Said magnetic material is taught to show a good affinity with a binder resin, improve the dispersion of a charge control agent, and is well dispersed in the binder resin resulting in improved uniformity and stability of chargeability in the toner (p. 7 [0092]). Additionally, Matsunaga teaches that the toners have from 55 to 95% by number of particles having a circularity of 0.950 or more (p. 8 [0098]). If the number of particles having this circularity is outside the stated range the toner is liable to suffer from charging failure (p. 8 [0100]). Furthermore, in order to ensure uniform chargeability, the toner is taught to have a particle diameter of from 4 to 12 micrometers (p. 8 [0101]).

Matsunaga teaches a mixture of high and low molecular weight binder resins in the toners disclosed in the inventive examples. Both polyester and vinyl binder resins are prepared having low and high molecular weights. Production example 6 discloses a vinyl monomer (VL-2) having a molecular weight of 6400 (p. 17 [0253]) and production example 12 discloses a binder resin (B-2) comprising 75 parts by weight of VL-2 and 25 parts by weight of high molecular weight vinyl polymer VH-2 (p. 17 [0261]). Example 21 discloses a toner (21) comprised of 105 wt. parts of binder resin B-2 out of a total of 198 total wt. parts (p. 17 [0265] and p. 18 [0281]). Therefore, 38% of toner (21) is the low molecular weight polymer (75 pt. Weight/198 pt. Weight = .38 x 100% = 38%). Furthermore, the two polymers that comprise binder resin B-2 are resins VL-2 and VH-2. VL-2 has a glass transition temperature of 60 C (p. 17 [0253]) and VH-2 has a glass transition temperature of 57 C (p. 17 [0257]) and therefore the two polymers have different softening points.

Matsunaga teaches that the toner have a dielectric loss tangent in the range of .025 to .08 in a temperature range of 100 to 130 C. This is outside the range recited in pending claim 3 of the present application. Furthermore, Matsunaga does not teach that the dielectric loss tangent have the relationship of the applicant's formula (1) in pending claim 1. JP 06-118700 (henceforth JP ‘700) teaches a magnetic toner comprising a binder resin ([0014]), a colorant ([0017]), and a magnetic material ([0022]). JP ‘700 teaches that as a toner is heated to and beyond it’s glass transition temperature, the peak dielectric loss tangent will coincide with the glass transition temperature of the toner. Drawing 1 of JP '700 shows that the shape of the peak is

symmetrical. Therefore, since the glass transition temperature (Tg) represents the maximum point of a symmetrical peak, it is clear that the toners of JP '700 behave according to the applicant's formula (1) since tandelta values are approximately equal at -10 and +10 degrees from the maximum point (Tg). This relationship can also be extended to the toner of Matsunaga as JP '700 teaches this as a general trend and not a phenomena specific to the toners described in JP '700. Furthermore, JP '700 teaches that a peak value of tandelta in a pyrosphere (the temperature range about the glass transition temperature) tandelta is usually in the range of 0.02 to 0.04 while at an ordinary temperature of 0-25 C tandelta of a toner is usually in the range of 0.001 to 0.01 ([0009-10]). Thus as temperature increases, so does tandelta. Examining drawing 1 of JP '700 clearly shows that tandelta starts off at a baseline value below 0 C and increases with temperature until a maximum tandelta value is reached about the glass transition temperature. Tandelta then decreases at temperatures above the glass transition temperature before finally ramping up rapidly at temperatures above 100 C. Matsunaga measured the tandelta values of their toners in this high temperature region of between 100 and 130 C (Abstract). The glass transition temperatures of polymers used for the binder resin are all in the range of 57-62 C and the glass transition temperature of the sulpher containing resin is taught to preferably be from 75 to 95 C ([0039]) and embodiments are disclosed with Tg's ranging from 27-133 C ([0223-0241]). Therefore the glass transition temperature of the toners would be expected to be approximately in the 65-75 C range and could be shifted depending on the sulpher containing resin incorporated in the toner. This glass transition temperature range

corresponds to the general range of a typical pyrosphere taught to be 50-75 C by JP '700 ([0009]). The toners of Matsunaga would therefore behave in the manner depicted in the graph of drawing 1 of JP '700. From drawing 1, it can be seen that as the glass transition temperature of a toner is increased, the graph is shifted horizontally (to the right) and therefore tandelta (post shift) will be lower at temperatures approaching the glass transition temperatures and higher at temperatures above the glass transition temperature. From this, it is clear that the toners of Matsunaga would have lower tandelta values at 40 C than at the 100-130 C at which they were measured. Furthermore, since the glass transition temperatures of the toner vary depending on the Tg of the sulpher containing resin, it is clear that the toners of Matsunaga inherently have tandelta values within the applicants range of .002 to .01. Matsunaga *et al.*, however, do not teach a true specific gravity for their toners.

Sawada *et al*. teach a toner comprising metal materials and possessing a specific gravity in the range of 1.35 to approximately 1.6 g/cm3 (p. 3 [0028]). Sawada further teaches that by suing a toner with a specific gravity within this range the toner can be easily captured in a pulverizing and classifying resulting in a superior manufacturing method (p. 3 [0028]). Additionally, with toners having a specific gravity below said range manufacture becomes problematic resulting in poor charging and charge stability (p. 3 [0029]). When the specific gravity is above said range, the required weight of the toner necessary for forming a good quality image becomes large and the cost of the toner increases. Additionally, resin concentration becomes lower

and the fixing ability of the toner suffers causing the toner to detach from the fixed image (p. 3 [0030]).

Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have created the toner particles of Matsunaga *et al*. to have a specific gravity within the range of 1.35 to about 1.6 g/cm3 as taught by Sawada *et al*. This would have resulted in improved toner manufacturing procedures as well as enhanced fixing properties and lowered production costs. Manufacturing the toner of Matsunaga *et al*. with a specific gravity within this range could be easily achieved by adjusting the specific gravity of the metal material used as magnetic additives.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-341598 (equivalent to Matsunaga *et al.* US PGP 2003-044708) in view of Sawada *et al.* (US PGP 2003/0039909) and considered with JP 06-118700 as applied to claims 1-4 and 6-7 above, and further in view of Ohtani *et al*. (US Patent 4789613).

The complete discussions of Matsunaga *et al*., Sawada *et al*. and JP '700 above are included here. None of these inventors, however, specifically teach that the toner have a dielectric constant of from 15 to 40 pF/m.

Ohtani *et al*. teach toner comprising a binder resin, a charge control additive, a colorant, and a highly dielectric material having a dielectric constant of at least 10 (Abstract). According to Ohtani, the material having a dielectric constant of at least 10 acts as a capacitor to promote the frictional charge of the toner surface and allows improved retention of the charge on the surface of the toner (Col. 3 ln. 49-54).

Furthermore, this effect is not diminished by an increase in humidity prevents charge leakage even if some of the conductive dispersant remains on the toner surface. These properties result in excellent developability and transferability without any sacrifice in image quality (Col. 3 ln. 54-60).

Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention to have created the toner particles of Matsunaga *et al*. to have a specific gravity within the range of 1.35 to about 1.6 g/cm3 as taught by Sawada *et al*. and to have adjusted the dielectric constant by adding the dielectric material of Ohtani. This would have resulted in a toner that had improved charge retention, improved stability in high humidity environments and excellent developability and transferability without any sacrifice in image quality. Furthermore, these improvements would have improved toner manufacturing procedures as well as enhanced fixing properties and lowered production costs.

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-341598 (equivalent to Matsunaga *et al.* US PGP 2003-044708) in view of Sawada *et al.* (US PGP 2003/0039909) and considered with JP 06-118700 as applied to claims 1-4 and 6-7 above, and further in view of Aita *et al*. (US Patent 4868085) and further in view of Kotsugai *et al*. (US Patent 6010814).

The complete discussions of Matsunaga *et al*., Sawada *et al*. and JP '700 above are included here. None of these inventors, however, specifically teach surface

additives having particle diameters of 100 nm or less or the dielectric properties listed in the applicant's pending claim 9.

Aita *et al.* teach a toner comprising a colorant, a binder resin, and inorganic fine powder (Abstract). Aita further teaches the use of a fine powder A that is present on the surface of the toner (Col. 4 ln. 61-63) and has a dielectric constant of 150 or more. Furthermore, fine powder A is taught to have a particle size around 0.1 to 5 micrometers (Col. 3 ln. 60 - Col. 4 ln. 11). Since 10^3 nm is equal to 1 micrometers, 0.1 micrometers is equal to 100 nm. Since Aita only discloses the lower range of 100 nm as an approximate example, values somewhat lower than 100 nm would also be included in this range. Employing said particles on a toner is taught to enhance the image density of the toner (Col. 3 ln. 60 - Col. 4 ln. 11) as well as the lubricate the photoreceptor (Col. 3 ln. 38-52).

Kotsugai *et al.* teach a toner comprising a binder resin, a colorant and external surface additives (Abstract). Said additives are comprised of hydrophobic titanium oxide and hydrophobic silicon dioxide having dielectric constants of from 2 to 6 (Col. 2 ln. 63 – Col. 3 ln. 2). Said particles are further taught to have a particle size of from 10 to 500 nm (Col. 4 ln. 64-67). Kotsugai teaches that said particles can be used for their excellent fluidity properties and dielectric properties and that by mixing them with other additive agents excellent charging ability and fluidity can be achieved (Col. 3 ln. 37-52).

Therefore, by incorporating surface additive particles charging ability, fluidity, and image density can all be improved. Aita teaches surface particles with a high dielectric constant that improve image density and lubrication while Kotsugai teach surface

particles that improved charging ability and fluidity. Therefore, it would have been obvious to any person of ordinary skill in the art at the time of the invention in attempting to maximize the charging properties and fluidity of a toner to have created the toner particles of Matsunaga *et al*. to have a specific gravity within the range of 1.35 to about 1.6 g/cm3 as taught by Sawada *et al*. and to have added the inorganic surface additive particles of Aita *et al*. and Kotsugai *et al*. This would have allowed the artisan to adjust the charging and dielectric properties of the toner while improving the fluidity of the toner.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER L. VAJDA whose telephone number is (571)272-7150. The examiner can normally be reached on 7:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher RoDee/
Primary Examiner, Art Unit 1795

/PLV/ 06/09/2008